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AN ACCOUNT OF THE FIRE AT RICHMOND HOUSE,

On the 21ſt of DECEMBER, 1791,

AND OF THE EFFICACY OF THE FIRE-PLATES, ON THAT OCCASION.

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ON December 21, 1791, at about eight o'clock in the morning Richmond Houſe took fire. The firſt cauſe proceeded from the curtains of a bed taking fire, in a very ſmall cloſet: The floor of this cloſet, and of the whole ſtory, of which this ſmall bed-chamber was one apartment was fire-plated. But the ceiling was not ſecured by fire-plates, and that ceiling was immediately contiguous to the roof, ſo that the fire from the bed, curtains, and other furniture of the cloſet, was immediately communicated to the laths and joiſts of that cieling, and to all the timbers and rafters of the roof. The roof which was immediately over the ſmall bed-chamber in queſtion, extended over the whole range of apartments on that floor, and conſtituted a flue of fire of about 70 feet in length. All the timbers of this roof were ſoon burnt, together with the quarter partitions, which divided the ſeveral apartments upon the bed chamber floor. All theſe materials in their burning ſtate fell down upon the fire-plated floor, and remained burning for ſome hours upon that fire-plated floor, without ſetting fire to the body of that floor, or penetrating into the apartments underneath.

This was the ſituation of things when I firſt ſaw the then raging fire and its effects, which was between eleven and twelve o'clock. This part of Richmond Houſe, which was the only part fire-plated, was a new building of about 70 feet in length, and 25 feet in breadth, annexed to the old houſe, and may be conſidered as a diſtinct houſe fire-plated, but with internal communications through ſeveral doors to the old part of the houſe. This fire-plated part of the houſe had ceaſed to burn with any active fire a long while before I ſaw it. The timbers of the roof, and the furniture of the apartments upon the bed-chamber floor, and the quarter partitions, and other combuſtible materials, above the level of the firſt fire-plated floor, could not take any great length of time in being burnt, and falling down upon that fire-plated floor. Here the fire would have ended, if it had not been for the communication of the fire through the roof, from the new building to the old part of the houſe which took fire, and continued burning for ſome hours, after the fire-plated part had ceaſed to burn with active force. All the furniture of the apartments underneath the fire-plated floor was removed without embarraſſment,

ment, many hours after the fire in the roof of the fire-plated part of the houſe had ſpent its utmoſt fury, and had been arreſted in its progreſs by the fire-plated floor. If that floor had not been fire-plated, the whole of the new building would have been rapidly and inevitably deſtroyed. But by the means of that fire-plated floor, the deſtruction from the fire only ſeized upon ſuch combuſtible parts of the houſe, as were above the firſt fire-plated floor, and therefore unſecured by the fire-plates. If the cieling of the bed-chamber floor, whence the fire proceeded, had been ſecured by fire-plates, ſo as to have intercepted the communication with the roof, and to have prevented the roof from taking fire, the firſt attack of the fire would ſoon have been ſtifled and ſubdued in the place where it began. But when the roof had taken fire, it became by its elevation and expoſition to the air, furious to the laſt degree, and inextinguiſhable, until it ſhould meet with ſome fire-plated floor to reſiſt the progreſs of that fire.

The fire-plated floor having thus reſiſted all impreſſion of the fire in its utmoſt fury, had fulfilled the extent of its pretenſions, but, after ſome hours, appearances of fire were ſeen at the edges of the floor in ſome parts. I ſhall examine and explain theſe circumſtances moſt minutely, becauſe the great pretenſion of the fire-plates is this; That no timbers of any floor whilſt they are under the dominion of the fire-plates, can take fire ſo as to adminiſter fuel to the conflagration of any houſe, as long as the fire-plates continue unbroken; and that if the fire-plates ſhould be partially broken, or not laid up cloſe to a wall, the active fire ſo let looſe from under the dominion of the fire-plates by any ſuch partial fracture, or deficiency near a wall, would not ſpread beyond that fracture or deficiency. This was preciſely the caſe at Richmond Houſe. The falling of the timbers of the roof made partial fractures of the fire-plates, and particularly near to thoſe walls where the hips of the roof had reſted. When the roof fell in, it brought a great quantity of bricks and coping ſtones along with it. This is the fact, as teſtified by a great quantity of bricks and coping ſtones fallen. There now lies, (December 26,) one remarkable piece of coping ſtone of more than half an hundred weight, cloſe to the fracture which it made in the fire-plates. And bricks lie univerſally about near to the walls, as having fallen in the concuſſion of the falling roof. The ſame reaſoning is undubitable reſpecting the fall of heavy timbers from the roof; and ſimilar effects muſt be preſumed from them in making fractures of the fire-plates. Wherever theſe fractures happened, the fire got to the timbers of the floor, and to the extent of ſuch fractures injured the timbers partially, not by a rapid or raging fire, but by a languid and ſlow progreſs, eſpecially as long as the cieling below remained entire. But the firemen on ſuch occaſions are very unadviſedly alert in pulling down the cielings, which, by adminiſtering the ventilation of air, creates and augments the evil. The firemen deſcribed the effect of their pulling down the cielings to be, that a looſe and rolling flame was kindled among the joiſts of the floor, which is the exact deſcription of all my experiments which I have tried upon the ſimilar caſe, at the experiment houſe at Wimbledon. That rolling flame chars the timbers to ſome depth, more or leſs, but, unleſs under the fracture, the timbers will not actively contribute to the conflagration.

The appearances upon examination of the timbers after the fire was extinguiſhed, correſponded exactly to this explanation. The firemen made many fractures in the plates with their fire-poles. The timbers took fire in proportion; but at or near the margins where they ceaſed to pull down the cieling, or to perforate the plates, the charring and deſtruction of the timbers ceaſed. There is one girder which is an extraordinary example and illuſtration of this point. The head of the girder cloſe to the wall, which was not covered by the fire-plate, was charred and burnt almoſt through; next to that part ſo burnt comes a length of 5 or 6 feet where the fire-plate had not been fractured, in which the girder is very little affected; and next to that comes a third portion of the girder, of about a foot and a half, where the fire-plate now (December 26) lies fractured in its place, and under that fracture, the girder is again almoſt burnt through; and for the remainder of this girder, the fire-plates over it are not at all fractured, and the girder remains perfectly ſound. There are many other examples of contiguous parts of timbers burnt or not burnt, according to the fractures in the plates or otherwiſe. The caſe of this girder is moſt ſtrongly in point, and proves with what rapidity, the whole floor would have been deſtroyed, if the fire-plates had not been there. The girder is a timber of great ſolidity not leſs than 17 inches by 14. If ſuch a timber could have been burnt through in two places, by a partial ventilation, we may eaſily conceive with what rapidity and fury, the leſſer joiſts and flooring-boards would have been deſtroyed if the fire-plates had not protected them.

The fractures which were made in the fire-plates by the fall of great timbers, and bricks, and coping ſtones, gave partial admiſſion of fire among the timbers of the floor, but as long as the cieling underneath remained unbroken by the firemen, the operation of the fire amongſt the timbers, was not more than languid charring. There were the three following caſes clearly diſtinguiſhable both in fact and principle. In the firſt place, where there was any fracture in the fire-plates from above, and the cieling not torn down by the firemen, the upper parts of ſuch joiſts were charred, and the lower parts were quite ſound and not diſcolored. In the ſecond place, where the in duſtry of the firemen had opened large ventilations under the fractures in the fire-plates, the firemen at the ſame time enlarging thoſe fractures, the timbers in ſuch places were not only charred but were burnt, in the current of aſcending air. In the third place, where the firemen had torn down the cieling under parts where there was no fracture in the fire-plates, the timbers were only blackened by the vicinity of neighbouring fire and ſmoke, but without the leaſt lateral extenſion of the fire to the timbers under the ſecurity of unbroken fire-plates. It is a maxim with firemen to make apertures by pulling cielings down, but even that ill-judged officiouſneſs did not ſet fire to the body of the fire-plated floor, although the fire-plates had ſuffered fractures from above as well as by the poles of the firemen below, with which in many places they made additional fractures in the plates. In ſhort, wherever the fire-plates were fractured or perforated, the fire made a proportional impreſſion upon the frame-work of the fire-plated floor, but, without any lateral extenſion beyond the fracture. In all other parts the body of the floor was uninjured by the fire.

Theſe are the principal facts and circumſtances reſpecting he fire-plated floors in Richmond-Houſe, in which the fundamental principles and operation of the fire-plates as ſecurity againſt fire, are fully illuſtrated and proved, by the greateſt and moſt deciſive experiment that could poſſibly occur. But there was another circumſtance reſpecting the poſition of the great timbers in this new and fire-plated part of Richmond Houſe, which if it had been preconcerted, to illuſtrate the inſecurity of timbers unguarded by fire-plates, could not have been more preciſely calculated for that proof. All the girders which were large timbers 17 inches by 14, were lodged in open receſſes in the walls. Theſe receſſes were arched over in the brickwork of the wall, ſo as to reſerve nitches in the wall for the reception and entertainment of fire, with a free ſpace of air to burn in. The fire-plating was not continued within theſe arched receſſes. The operation of theſe arches was therefore only calculated to preſerve a void ſpace over the heads of the girders, thereby to tranſmit the ventilation of air from below, and to form a blaſt of air and fire for the deſtruction of the heads of thoſe girders; and the firemen from below very aſſiduouſly acted their part, in ſupplying that current of air, by pulling down the plaiſter cieling, and in many places enlarging the fractures in the fire-plates. With all theſe concurrent aſſiſtances, it ſtill was 20 hours before the heads of theſe girders were charred and burnt through, and then the floor of one apartment gave way, being unſupported by the heads of the girders, and ſunk down bodily altogether, with its frame-work undeſtroyed, and with its plaiſter cieling attached underneath, except in thoſe places where the firemen had torn it down. If the firemen had not opened the plaiſter-cieling from below to ſupply a vertical current of air, it could not have been poſſible that timbers of ſuch large dimenſions as 17 inches by 14, could have been deſtroyed by fire dropping through partial fractures in the fire-plates from above, which would ſoon have been ſmothered in its own aſhes; but as many apertures from below had been opened by the firemen, a conſtant draught of air circulated round the heads of the girders, and was reverberated upon them, by the arched roofs of the nitches in which the girders were lodged. If the girders had been laid ſolid in the wall as joiſts uſually are, they could not have been at all affected by the fire, becauſe the fire-plating was carried cloſe to the wall, although it was not continued within the arched receſſes in the wall. All the girder-heads which were lodged in the partition wall between the fire-plated apartments and the old houſe (one excepted) were almoſt entirely deſtroyed. The fire which had taken place in the old houſe contributed very materially to this effect, by the immenſe heat of the partition wall, having fire on both ſides. But even this circumſtance could not have produced the effect independent of the officiouſneſs of the firemen, in pulling down the cieling to give the ventilation of air.

In this range of girders there was one girder-head, which was perfectly untouched through the whole courſe of the fire. The circumſtances of this girder were firſt, that neither coping-ſtones nor bricks had fallen near to that girder, ſo as to make fractures in the fire-plates: 2dly, the arch of the nitch in which the girder-head was lodged, was extremely low, almoſt cloſe to the upper ſurface of the girder: and 3rdly, the firemen had neither torn down the cieling underneath, nor had made any perforations in the fire-plates by their fire-poles, of which they had made ſuch deſtructive uſe in other places. In ordinary cauſes where firemen are called upon to exert their functions, it may be a juſtifiable principle by apertures to ſearch out the receſſes of lurking fires, becauſe in ſuch ordinary caſes, lurking fires are ſoon converted into active and raging fires upon their own materials; whereas in the caſe of the fire-plates, no lurking fire can attain the aſcendant, as long as thoſe plates remain in their place and unbroken. The fire-plates form an unconquerable negative againſt the converſion of any lurking materials of fire into active and raging conflagration.

The principle upon which the fire-plates act is, As an incombuſtible midriff reigning over the whole of the upper ſurface of the joiſts. And although theſe plates may be partially broken, by caſual fractures, yet theſe apertures cannot be enlarged by the ſubſequent operation of the fire, the fire-plate itſelf being eternally incombuſtible. A jagged aperture between joiſt and joiſt will always remain jagged and clogged up, not affording a liberal or yielding paſſage of air. As the fire-plates are attached to the upper ſide of the joiſts, they cannot deſert their poſt by falling down between the joiſts. The jagged fractures in the fire-plates remain ſtill jagged and clogged up in ſuch places where the firemens poles were not employed during the fire to tear away the fire-plates, and to enlarge the apertures. It was this latter cauſe which contributed moſt principally to the deſtruction of the heads of the girders. The abſolute and entire ſecurity of one of the girder-heads is a full proof of this. If the firemen had torn down the cieling, and perforated the fire-plates contiguous to that girder-head, it cannot be doubted but that it muſt have ſhared the fate of the reſt. The girder-heads, hitherto ſpoken of, were thoſe whoſe heads were lodged in the party-wall between the new and the old building, and where the firemen tore away many ſquare feet of the fire-plating. On the oppoſite ſide where the fire-plates were unbroken, and the cieling untouched by the firemen, the girders and joiſts, cieling and cornice are now as ſound as when they were put up, without the leaſt diſcoloration or other indication of fire.

As to that floor, which I have ſpoken of, as having ſunk down altogether, about 20 hours after the commencement of the fire, it ſhould be obſerved, that it did not ſink in conſequence of any deſtruction of its own frame-work by the fire, but by the deſtruction of the heads of the girders in their arched nitches, by which the whole flooring loſt its holdfaſt in the wall. The floor next below the bed-chamber floor conſiſted of two very large apartments, viz. a drawing-room and a dreſſing-room, the areas of both together being near 70 feet by 26 or 28 feet. There was no injury done either to the paper or to the cornices of thoſe rooms, excepting under the girder-heads, which had taken fire in their nitches, and where the firemen had ſo injudiciouſly torn down the cieling. If the girders had not been laid hollow in the wall, and much more if the firemen had been reſtrained from tearing down the cielings, there would have been no appearance of fire in theſe apartments at all. The failure of the girder-heads in one apartment, by which the frame-work of the flooring loſt its ſupport in the wall, was owing to the officious indiſcretion of the firemen in tearing down the cieling. Upon the whole of this matter, it is now a public and approved truth, by this great and unfortunate experiment, that wherever the fire-plates maintain their horizontal poſition and dominion over the timbers of the houſe, no timbers of any floor ſo ſecured, will either take fire, or adminiſter fuel to any conflagration. This is the breviate of the facts before us, and the ſummary of all the pretenſions of the fire-plates.

There was one ſmall apartment in the old part of the houſe which was fire-plated, the mention of which, though not of equal importance with the foregoing, ought not however, to be omitted. It was a ſmall bed-chamber, about 16 feet long by 10 feet wide. The fire made its way to this apartment from the roof of the new building, through the roof of the old building, and ſo deſcended into the little bed-chamber in queſtion. The cieling of this room, the bed, and all the furniture were deſtroyed, and fell down upon the fire-plated floor of the room. As the area of the bed chamber was ſmall, and encloſed in the center of the houſe, it was not ſo furiouſly expoſed to the rapid conflicts of the elements of fire and air, as the raging conflagration in the roof of the new building, which was 70 feet in length, and 25 in breadth. As the experiment upon this ſmaller ſcale was not ſo powerful as that upon the largeſt ſcale, I do not dwell any farther upon it than as a fair and concurrent teſtimony of the efficacy of the fire-plates againſt fire, wherever they are applied. The contents of this room were deſtroyed by the fire, and the flooring boards were charred, more or leſs, in different parts, but neither the joiſts nor timbers of the floor, nor the cieling underneath were in the leaſt degree either injured or affected. Theſe are the principal facts and circumſtances which were obſerved by perſons preſent at the conflagration at Richmond Houſe; and the minute detail and conſequences of them, were moſt accurately examined and inveſtigated for ſeveral days ſucceſſively after the fire. By all theſe teſtimonies it appears, that the invention of the fire-plates is founded upon rational and irrefragable principles, according to the eternal natures of the elements of fire and air, and that their efficacy, upon the ſevereſt unapprized trial, has proved fully adequate to their utmoſt pretenſions.

The reſulting inferences from the foregoing facts and reaſoning are very evident.—The firemen ſhould not be permitted by any means to tear down the cielings under any fire-plated floor, and much leſs to tear away the fire-plates themſelves in the very moment of danger.—As to the arched nitches in which the girders are lodged, if they are neceſſary in building, the arches ſhould be as little elevated as poſſible above the ſurface of the girder, and the fire-plates ſhould be extended over the head of the girder; and in general the fire-plates ſhould be extended into every receſs, and cloſe to every wall.—As to the protection of any houſe from fire in the roof, that may very eaſily be effected by the application of fire-plates above the cieling of the uppermoſt ſtory. The fire-plates may protect any parts of houſes that are under their cover, but they cannot protect any combuſtible materials above their own level. The ſecuring of roofs is a matter of option, it is not a queſtion upon life; any one may always be ſure of an eſcape downwards from fire above the cieling. The queſtion in

this

this caſe is upon property, which may be ſecured by a policy from an office of Inſurance. The valuables in the houſe, from the roof to the firſt fire-plated floor, ſhould be inſured at an office, if not ſecured by fire-plates. The greateſt danger from fire in any roof is to the contiguous houſes if they are not fire-plated.

This unfortunate example of the communication of fire by the roof of any houſe to any contiguous buildings, which is now ſo conſpicuouſly brought before the public conſideration, would leave me inexcuſable if I were not to direct the application of this argument to an object of great public importance, though a little out of the line of the preſent caſe. I mean the ſecurity of the roofs of Rope-houſes and Storehouſes in his Majeſty's Dock-yards. In the year 1785, I was requeſted by the firſt Lord of the Admiralty to draw up an *Argument upon the uſe and application of the fire-plates in the Dock-yards againſt the Military fire of an Enemy in the time of War*. I drew up a memorial accordingly upon that ſubject. In that memorial is the following paſſage, "The "roofs of the ſtorehouſes and ropehouſes which are not at "preſent ſecured ought to be fire-plated under the rafters, "and furniſhed with fire-ſcreens. The roof of a ropehouſe "if ſet on fire by ſhells, would be a flue of fire for a quarter "of a mile in length, and being raiſed above the perpendicular of the wall, would by an high wind be ſcattered over the whole Dock-yard. I feel myſelf particularly indiſpenſably called upon to ſuggeſt this article "of public danger for conſideration, becauſe ſeveral of the "ſtorehouſes are guarded from fire reſpecting the floors, "but not reſpecting the roofs."

I do not ſay this as contending for the abſolute neceſſity of ſuch an immediate meaſure, but only to diſcharge myſelf of the reſponſibility in caſe any unexpected event ſhould overtake the public by ſurprize. There is certainly no imminent danger of a military attack upon the Dock-yards. It is a queſtion not for private deciſion, but for public judgment. My title in it extends no farther than to ſtate the caſe before the public.

I think that I have now ſtated all the circumſtances which relate peculiarly to the caſe of Richmond Houſe. I ſhall ſubjoin a few general remarks. It is to be obſerved, that every poſſible degree of ſecurity againſt fire may be given by the fire-plates, according to the neceſſity of each caſe, and according to the mode of the application of the plates. In any extreme caſe, ſuch as for the ſecurity of the dock-yards againſt the military fire of an enemy, the utmoſt power of the fire-plates ſhould be applied, by the double application of them on each ſide of the joiſts of any floor, with ſome ſand or rubbiſh upon the plates which are applied to the under ſide of the joiſts.—Ships of war may likewiſe be ſecured by copper fire-plates againſt any general conflagration. But it would be an extravagant propoſition to apply ſuch caſes as theſe to private dwelling houſes. The caſe of private houſes ſhould be regulated upon rational, practical, and commodious principles, not as againſt the military fire of an enemy in war. Richmond Houſe was ſecured only by a ſingle application of the fire-plates, upon the upper ſurface of the joiſts in each floor. The proof has been adequate to the pretenſions. The reſpective degrees to which the fire-plates may be applied from the preventive ſecurity of the ſingle application of them even to the utmoſt power of reſiſtance to the military fire of an enemy are points of free option. Therefore the adequate application of them, neither for the more nor the leſs, is a conſideration of prudence and diſcuſſion, according to the circumſtances of each caſe.

It appears to me that it would be an object worthy of public conſideration to appoint ſurveyors, or to extend the powers of the preſent ſurveyors, under the building act 1772, for the purpoſe of inſpecting the adequate application of the fire-plates, that a beneficial public invention may not be diſparaged by doubtful or unexplained events. As for inſtance; in the caſe of applying the fire-plates for the ſecurity of parts of houſes, without ſecuring the whole of each houſe, the adequacy or inadequacy of any ſuch proviſion muſt depend upon each ſpecial caſe. A central apartment alone being armed with fire-plates, with all the circumjacent apartments above, and below, and ſideways unſecured, could not be expected to ſtand proof in any general conflagration. Such a caſe ſpeaks for itſelf. On the contrary; one entire ground floor of banking apartments, or of warehouſes and ſhops for merchandize, in the city of London, might very eaſily be ſecured by the fire-plates, altho the upper parts of any ſuch houſe ſhould be deſtroyed by fire. Such caſes as theſe ſhould be accurately executed under the inſpection of public ſurveyors.—In the chambers of lawyers, in the inns of court, there may be title-deeds and ſettlements, &c. to the amount of 10 or 20 thouſands a year. It would be a very defective policy in ſuch caſes, to confine the uſe of the fire-plates to one ſingle ſet of chambers. All the chambers in one ſtaircaſe ſhould be ſecured at one and the ſame time, and the common ſtaircaſe ſhould be ſecured at a common expence. As the application of the fire-plates extends equally to houſes which have been many years built, as to new buildings, all applications ſimilar to thoſe which I have mentioned are become practicable, with the greateſt facility, and to the utmoſt degree of ſecurity. A ſet of chambers might be ſecured with no other trouble than removing the furniture of any room into an adjoining one for a ſingle day, at any time of vacation. The ſame facility, with a little management, may be applicable to warehouſes, and to bankers apartments, or to any other antient exiſting buildings, either in the metropolis, or throughout the kingdom.

I ſhall ſtate one caſe more, which is peculiarly intereſting to the public attention, at the preſent time, while plans are under conſideration for rebuilding the play-houſes. The point which I mean is for the future ſecurity againſt fire, of the ſpectators in thoſe theatres. If ſuch a meaſure ſhould be conſidered as adviſeable, the moſt judicious mode of applying the fire-plates in the caſe, ſhould be deliberately inveſtigated, and the execution of the work ſhould be conducted under the warrantry of public inſpection. I have taken the liberty in a former publication to ſubmit my thoughts to the public on this ſubject. As I have nothing farther to add, nor any thing to detract from thoſe ſentiments, I ſhall only tranſcribe the former words as follows, viz.

" Beſides the application of the fire-plates, for the " ſecurity of common dwelling houſes againſt fire, there " is a caſe of a peculiar kind, and greatly intereſting to " the public, in which the fire-plates might be applied " very beneficially, which is in a play-houſe, to ſecure the " ſpectators, not only againſt the real danger of fire, but " likewiſe againſt the tumult and terror of alarms, which " have upon ſuch occaſions produced very fatal conſe- " quences. Fire in any play-houſe can only take riſe in " ſome of thoſe parts which are near to, or connected with " the ſtage. Thoſe parts of the houſe which are allotted " to the ſpectators are not liable to take fire originally " and ſuddenly. The danger is from the ſcenery and " machinery appertaining to the repreſentation. In any " ſuch caſes of danger and alarm, one pair of ſliding " ſcenes, or a curtain of fire-plates, conſtructed in ſuch " manner as to drop down in partitions, might be adapted, " with proper mechanics, ſo as to interpoſe an incom- " buſtible ſcreen for the protection of the ſpectators, and

“ to give time for a deliberate and ſafe retreat, without
“ panic or conſternation. The principle of interpoſing an
“ incombuſtible ſcreen, to prevent the lateral communication
“ and effect of fire, is totally diſſimilar to the
“ horizontal application of fire-plates under the floors of
“ dwelling-houſes; but, in the courſe of making experiments,
“ it has incidentally occurred. An apartment in
“ the experiment-houſe at Wimbledom, adjoining to the
“ magazine of combuſtibles, with an open door-way
“ between them, was ſecured from the flames and fire of
“ the magazine by a ſcreen of fire-plates, as often as the
“ experiment was repeated. The practicability of adapting
“ this idea to a play-houſe is a matter of very
“ general intereſt, and cannot be thought undeſerving
“ of attention.”

If any aſſiſtance of mine ſhould be thought ſerviceable either in the dicuſſion of this queſtion, or in the execution of the work, I truſt that I need not employ many words of profeſſion with the public, to render them aſſured of my utmoſt exertions.

F I N I S.

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